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BIRDS OBSERVED ON MT. MANSFIELD AND THE WEST END OF STOWE VALLEY AT THE BASE OF THE MOUNTAIN, IN THE SUMMER OF 1902.

BY MRS. ELIZABETH B. DAVENPORT.

In the October Auk, 1902, appeared Mr. Arthur H. Howell's "Preliminary List of Summer Birds of Mt. Mansfield," the first published article treating exclusively of the birds of that region. Incidentally Mr. Howell summarizes previously published Avi-faunal lists to date, also some of the literature upon the Flora of the region.

His story covered June 14-24, 1900, June 23 to July 2, 1902, and he found some interesting differences in bird distribution in these two years, his records differing also from those of Mr. Bradford Torrey made in 1885. The face of this territory is undergoing changes wrought by the lumbering interests, which are likely to increase in the near future, and it seems desirable that careful study be given the region, and note made of the bird life.

Mr. Howell offers his "List" chiefly as "a contribution to our knowledge of the breeding range of Canadian Species," and finds its "faunal relationships almost pure Canadian," "even the few Alleghanian species found in the valley being extremely rare."

The bulk of the mountain lies nearly north and south, sweeping up grandly from the valley on the western side, its base both here and on the east defining far-reaching curves, whose steep sides are covered with forests on their lower slopes, and whose broken rugged cliffs lift themeslves by sharp ascents to the great crest of the mountain.

Approaching from the Stowe side the ascent from the valley begins at the foot of a spur thrown out toward the east, the carriage road winding along its sides, and crossing to the main ridge as the summit is neared. Here for the first time the whole sweep of the mountain-top breaks on the view, the fleeting outline crowned by the majesty of the Chin. A mile and a half of wind-swept summit stretches away to the north, sometimes only a narrowing mass of weather-worn rock, sometimes widening out, and making boggy hollows which shelter a few stunted trees, or again giant masses of broken, splintered rock thrown together in great confusion, and giving but perilous foothold as one nears the great valley and gorges where snowy clouds often drift or linger, and out of which other mountain summits rise like somber islands, or maybe glow with splendid color reflected from a gorgeous sky at sunset.

Below the forest proper the spur widens out into a plateau, and at its base unite the two streams which drain the mountain sides, the North Branch coming down through Smuggler's Notch, having its birth in the pure spring which bursts from the heart of Sterling Mountain, cold, swift and forceful, a brook from the hour its waters first meet the light of day.

The forest is mainly red spruce *(Pica rubra)*, balsam fir *(Abeis balsamea)*, hemlock *(Lsuga canadensis)*, paper birch *(Beluta paprifira)*, yellow birch *(Beluta luten)*, beech *(fagus americana)*, and sugar maple *(Acer barbatun)*.

Where the virgin forest has been removed the undergrowth is very dense.

My stay was from June 6 to July 31, with the exception of a few days early in July (2-5), when I joined the B. H. B. Club at the midsummer meeting.

June 13-29, July 20-31 was spent at the summit.

June 6-13, July 5-20 I was stationed at Mr. Harlow's, and observations made on North Branch, South Branch and slopes of the mountain to the limit of timber.

The mile and a half of road from the foot of the plateau to Bingham's Falls at the entrance of the Notch, proved rich in species. For most of the way the road runs well above the wild, rocky bed of the swift-flowing brook, presenting along its borders the variety of scant open woodland, heavy forest, areas of recent growth, and areas of mountain-side where lumbermen have left trunks and tree-tops. Over the shorn forest, vines and bushes are rapidly growing, offering shelter and food to birds of the open woodland border.

Birds characteristic of both Alleghenian and Canadian faunæ seemed to intermingle here. Scarlet Tanagers and Wood Pewees were in close touch with Olive-backed Thrushes and White-throated Sparrows, and the Winter Wren slipped mouse-like among the prostrate trees.

Some puzzling questions of distribution were presented. Below the Notch, Olive-backed Thrushes were confined to this Branch, as were White-throats and Juncos, while they were never found on the South Branch, just across the narrow plateau.

The Wilson and Hermit Thrushes were distributed on the South Branch only, and though the Hermits were in the forest at the base of the mountain and well up along the Notch road, they were always in the woods at the left of the road, the Mansfield side.

These and some other questions relative to distribution are reserved for further study before discussion.

The only birds listed not found along these Branches, the plateau or mountain to 3,000 feet altitude, are Bicknell Thrush and Black-poll Warbler, these two birds being confined exclusive to the mountain summit.

1. **Actitis macularia.** Spotted Sandpiper.—June 9. Through the season, North Branch and down the valley.

2. **Bonasa umbellus. (togata?)** Ruffed Grouse. Mr. Howell refers all the Grouse found in this region to the Canadian form. I could not determine this definitely. Heard frequently drumming about the base of the mountain. Met with young all through the season from June 13 to July 17, on the lower slopes of the mountain to the Half-way House.

3. Accipiter velox. Sharp-shinned Hawk.—Summit, June 15, occasionally till late in July.

4. **Accipiter atricapillius.** Goshawk.—All through the season.

about the cliffs rising from the Notch. Young well grown, second week in July. Mr. William Brewster thinks these must have been Duck Hawks. (Tails were long.)

5. **Coccyzus americana.** Yellow-billed Cuckoo.—Occasionally about approaches to the Notch road.

6. **Ceryle alcyon.** Kingfisher.—Frequently met along the Branch brooks.

7. **Dryobates villosus.** Hairy Woodpecker.—Well up the mountain road on the underhill side. Not numerous.

8. **Dryobates pubescens medianus.** Downy Woodpecker.—Frequent on mountain slopes and lower valleys.*

9. **Sphyrapicus varius.** Yellow-bellied Sapsucker.—Up the mountain road as far as the spring. In the maple woods at the base.

10. **Colaptes auratus luteus.** Northern Flicker.—Common about slopes and in the valleys. About the farm above Mr. Harlow's.

11. **Chætura pelagica.** Chimney Swift.—Common in the valley. Often seen flying over the Summit.

12. **Trochilus colubris.** Ruby-throated Hummingbird.—Frequent about base of mountain.

13. **Tyrannus tyrannus.** .Kingbird.—Occasional in valley to base of mountain.

14. **Myiarchus crinitus.** Crested Flycatcher.—Common about Mr. Harlow's, especially at lower end of North Branch. Could be also seen at the mountain foot proper.

15. **Sayornis phœbe.** Phœbe.—About all farm buildings. Nesting at Mr. Harlow's.

16. **Contopus virens.** Wood Pewee.—Rare. Heard first at Mr. Harlow's; June 8, on the North Branch; July 17, at Half-way House; June 19, on Underhill trail.

17. **Empidonax flaviventris.** Yellow-bellied Flycatcher.—Two pairs located near the summit in swampy woods, June 17. Under observation at intervals till July 28. Also on Underhill trail, June 19.

18. **Empidonax traillii alnorum.** Alder Flycatcher.—Occasionally noted all the way to mountain's foot along the small brooks flowing through the bushy pastures.

19. **Empidonax minimus.** Least Flycatcher.—Common in the valley. Well up the mountain side on the Underhill trail, June 19.

20. **Otocoris alpestris praticola.** Prairie Horned Lark.—Mrs. Herbert E. Straw first reported these birds in the Stowe valley in 1898. Mr. Howell found them at the same point and reported some twenty-five or more in 1901. In 1902 these birds were observed about the same fields and hill, and on June 30 several were seen and heard

*A woodpecker not surely identified but resembling the Arctic forms in general apperance, working between two tree trunks, and seen in profile only outlined against sky. Notes unfamiliar. At Bingham's Falls, and once at base of mountain.

on the sloping meadows toward Morristown, some three miles from the point to which they seemed to have been previously confined.

21. **Cyanocitta cristata.** Blue Jay.—Not common. Heard usually in the valley. Sometimes well up the mountain road. Heard calls from summit July 28.

22. **Corvus americanus.** American Crow.—Common at base of mountain. Saw Swallows (Barn and Eave) chasing crows over the meadow, June 9. Crow flying low, carrying some object in bill which it finally let fall.

23. **Dolichonyx oryzivorus.** Bobolink.—Distributed through all the meadows to mountain foot. Singing as late as July 8. About the orchards July 29.

24 **Agelaius phœniceus.** Red-winged Blackbird.—A few seen in meadow below the Forks.

25. **Icterus galbula.** Baltimore Oriole.—Four pairs located between base of plateau and Stowe village, July 13. Old birds appeared with young in the orchard about Mr. Howell's, but none were nesting above the junction of the Branches below the house.

26. **Carpodacus purpureus.** Purple Finch.—Numerous about the foot of mountain and also at Mr. Howell's. In full song all the season. Feeding on dandelion seeds, June 17.

27. **Loxia curvirostra minor.** American Crossbill.—About the plateau all through the two months. In flocks and pairs. Often feeding on the ground, holding the head sidewise to pick up grass seed. Frequently eating seed of dandelion, holding seed with plume projecting from side of bill till detached, then plume dropped. June 16, well toward top of mountain. Occasionally flying about the base in June.

28. **Astragalinus tristis.** American Goldfinch.—Abundant in the valley to the forest at base of mountain.

29. **Spinus pinus.** Pine Siskin.—Frequently seen in flocks flying about the Nose.

30. **Pocœcetes gramineus.** Vesper Sparrow.—Abundant in valley and upland meadows.

31. **Coturniculus sandwichensis savanna.** Savanna Sparrow.—Distributed along the plateau. A few pairs in meadows near Stowe.

32. **Zonotrichia albicollis.** White-throated Sparrow.—Along the North Branch. Not on the mountain till well toward the summit (Inn trough), then rapidly increasing in numbers. One of the most abundant birds on the mountain top where they were in full song till I came down, July 29. Not so many individuals singing in July. Sang from dawn till 10 P. M. June 23, earliest date observed feeding young on summit. Some birds showed individual phrasing of the song common to the species, which was maintained through the season.

33. **Spizella socialis.** Chipping Sparrow.—Abundant in the lower valley, but rare on the plateau.

34. **Spizella pusilla.** Field Sparrow.—This bird was searched

for diligently in the bushy pastures at the foot of the mountain. Neither heard nor seen till July 17, when a single one was found at the above place.

35. **Junco hyemalis.** Slate-colored Junco.—Ranging with the White-throats, but extending into the Notch. On the summit the White-throats were not found north of the rocky masses known as the "lips," but the Juncos were all along the ridge to the "Chin." Very familiar about the hotel, coming to the piazza for crumbs, and feeding their young all about the open space.

36. **Melospiza cinerea fasciata.** Song Sparrow.—Common on the plateau and valleys. The most abundant bird of that region.

37. **Zamelodia ludoviciana.** Rose-breasted Grosbeak.—Nesting on the plateau, along the North Branch and woods of lower mountain slopes. Heard and seen several times beyond the Half-way House, and once at the limit of the large yellow birches.

38. **Passerina cyanea.** Indiga Bunting.—Common on the plateau and Branches. Also seen at the mountain foot proper.

39. **Piranga erythromelas.** Scarlet Tanager.——At base of the mountain, the North Branch, and hill below Mr. H.'s house.

40. **Chelidon erythrogaster.** Barn Swallow.—Abundant in the valley. Nesting on the plateau, north edge of the mountain forest.

41. **Petrochelidon lunifrons.** Cliff Swallow.—Record as No. 40.

42. **Clivicola riparia.** Bank Swallow.—Common in suitable situations below the plateau.

43. **Ampelis cedrorum.** Cedar Waxwing.—First observed in valley June 9, which Mrs. Straw thought an early date. Later seen occasionally about the base of the mountain.

44. **Vireo olivaceus.** Red-eyed Vireo.—Abundant in maple woods at base of mountain. Common all about the lower slopes and valley, and heard almost to limit of timber.

45. **Vireo gilvus.** Warbling Vireo.—Rare in the lower valley and not heard at any other point.

46. **Vireo solitarius.**. Solitary Vireo.—Occasionally on the lower slopes. Always in the vicinity of hemlocks.

47. **Mniotilta varia.** Black and White Warbler.—Common on the lower slopes and about the plateau.

48. **Helminthopila rubricapilla.** Nashville Warbler.—On the North Branch, at foot of plateau, in the orchard opposite Mr. Howell's. Also again near the mountain summit, where this bird was still singing July 28. Less numerous than any other warbler.

49. **Compsothlypis americana usneæ.** Northern Parula Warbler.—Not abundant on the mountain proper, but found well up among the hemlocks. More numerous along the North Branch.

50. **Dendroica æstiva.** Yellow Warbler.—None found above foot of plateau. Not abundant.

51. **Dendroica cærulescens.** Black-throated Blue Warbler.—Very common about the Falls, the North Branch and lower slopes of mountain, ranging up through the deciduous woods in the open

spaces, and edges of clearings. Feeding young at foot of mountain, June 30.

52. **Dendroica coronata.** Myrtle Warbler.—As low down the mountain as the "S" bend. Very numerous about the summit. Often singing sitting on tips of firs and spruces. They had a pretty habit of scouring along the edges of roofs of the hotel and barn, and poising on wing to pick out spiders from under the eaves, the outspread wings and hovering motion showing their rich coloring to great advantage. Still in song there July 28.

53. **Dendroica maculosa.** Magnolia Warbler.—Occasional on the North Branch, but more often found in the pastures above the South Branch, and always among the young spruces and firs. A few noticed on the mountain road.

54. **Dendroica pensylvanica.** Chestnut-sided Warbler.—Common along the North Branch and shrubbery clearings of the mountain toward the base. First found feeding young, July 8. The sexes have different alarm notes. Verified for first time this year.

55. **Dendroica striata.** Black-poll Warbler.—Abundant among all the stunted spruces and firs from altitude of 3,000 feet to region about the summit. Never heard them much north of the hotel. The rhythmic beat of their notes never musical, but the impression of ebb and flow most agreeable. Feeding young, July 26.

56. **Dendroica blackburniæ.** Blackburnian Warbler.—Ranging with the hemlocks, but singing and feeding largely in the deciduous trees—a habit I have noticed about Brattleboro. Common along North Branch.

57. **Dendroica virens.** Black-throated Green Warbler.—Common along the North Branch. Well up the mountain. Found always among the hemlocks.

58. **Seiurus aurocapillus.** Oven-bird.—Abundant along North Branch and mountain road wherever open deciduous woods abound. Flight song June 11, then nightly till early in July. Feeding young July 11 (mountain road). July 6, male about Mr. Howell's orchard.

59. **Geothylpis philadelphia.** Mourning Warbler.—Heard but a few times at the foot of the mountain in the thickets and edge of woodland. Mr. Howell reports them in the Notch.

60. **Geothylpis trichas brachidactyla.** Northern Yellow-throat.—Abundant about streams at foot of plateau and North Branch.

61. **Sylvania canadensis.** Canadian Warbler.—Nesting along North Branch. Common where timber had been cut and bushes had grown up among the abundant tree-tops.

62. **Setophaga ruticilla.** Redstart.—In the second growth timber on Notch road almost to Bingham Falls. Also along the South Branch and road from valley to Mr. Harlow's. Not abundant. Young out of nest July 29.

63. **Galeoscoptes carolinensis.** Catbird.—Common in the valley. Observed almost to edge of mountain forest along the bushy streams in the pasture.

644. **Olbiorchilus hyemalis.** Winter Wren.—Of this bird Mr. H. reports: "Mr. Lorry writes me that he noted them several times during his visit in '85 on the upper part of the mountain. I was disappointed not to find them, but I am certain they were not there in '99-00, for although the bird might be overlooked the song is not likely to escape notice." This is a most interesting report, for 1902 found a different record, so that I give a full acount of the distribution as I found it. At Bingham Falls and further down the North Branch. Once both seen and heard at the junction of the Branches (July 20 for latter record); also in the Notch. Again about half-way up the mountain road. Four pairs about the summit. Heard on the underhill slopes and once at the Chin on the Notch slopes. As Mr. H. says, it would not be likely that this bird could be overlooked if present. From June 13 to 18 song heard about the Summit House from faintest dawn till after 9 P. M., and singing daily till July 28, but song not continuous after about June 20. I could never decide if the song sounded the more beautiful in the deep forest among the mossy tree-trunks about whose prostrate forms spinulose ferns clustered, and where water filtered and dripped and lay in tiny pools, or where the rich silvery notes greeted one in the closing hours of the day as the glowing tints of sunset faded from the sky and mountain tops, and purpling shadows folded in the magnificent rocky ramparts of the ridge.

65. **Sitta carolinensis.** White-breasted Nuthatch.—Not common, but well up the mountain ranging with the Chickadee.

66. **Sitta canadensis.** Red-breasted Nuthatch.—June 12 in maple wood at base of mountain, and twice on South Branch. Was surprised not to find this bird more generally distributed, and think an earlier exploration in the Notch would have changed my record.

67. **Parus atricapillus.** Chickadee.—Feeding young at base of mountain June 8. Well distributed on North Branch and hillside below the plateau. On mountain road among the hemlocks. Not abundant.

68. **Regulus satrapa.** Golden-crowned Kinglet.—But once, at foot of mountain.

Hylocichla mustelina. Wood Thrush.—Mr. H.'s record for this Thrush is, "I think there were two pairs nesting there in 1899," and "heard the song and alarm note several times in the damp maple woods at base." In 1900 could find no trace of them, nor have they been observed by Mrs. Stowe in the Stowe Valley, so they are probably irregular in their occurrence there. Early one morning I thought I identified the song in the direction of the maple woods, of which Mr. H. writes, but the distance was too great to hear a whole phrase. This was the only occasion when any note was heard which could be related to this species, though I searched and listened diligently.

69. **Hylocichla fuscescens.** Wilson Thrush.—Only on the South Branch and in growth of young maples approaching base of mount-

ain. Rather common. Young hatched June 11. A bird and nest of unusual interest found June 8. Nest in group of six young maple trees growing closely together. Broken sticks had lodged in the group, and large beech leaves made the foundation of the nest at about 18 inches from the ground. *The nest was of moss, thick walled, deeply cupped, well sunken in the bed of leaves. Lined with fine grass and fibers. I did not handle the eggs, but they looked like typical Wilson eggs. The bird was not typical Wilson. No warm tints anywhere. Back, wings, tail and rump just the color of the young maple bark. Throat matched the blanched beech leaves over which it was lifted. Breast creamy; also sides. Streaked on sides and on breast, streaks running to the bill, but leaving throat entirely clear. Throat, eye ring and lores white, with the lores strongly marked. Calls and alarm notes those of the Wilson, and neither song nor notes of any other Thrush heard in vicinity. Studied the bird at range of six feet, for three hours at a time, for three days. Four young safely hatched June 10.

70. **Hylocichla aliciæ bicknellii.** Bicknell Thrush.—Abundant on the whole mountain crest wherever the swampy ground supported a growth of dwarfed spruce or fir. Found as low on the mountain road as the turn which first brings the hotel in sight. In full song when I first reached the summit, June 13, singing from earliest dawn till 10 P. M., both about the house and on the underhill side of the ridge. After June 20 song diminished, but often heard as late as July 29. Young well grown July 22. Their thrush habit of singing in the tops of dead trees or on projecting dead branches gave one much opportunity to see them. Were shy of near approach till young were hatched, then came about house and barn from out their cover, feeding freely on the ground and in the barn-yard. Occasionally while incubating would be seen running a little ahead of us on the bald rocky ridges toward the Chin, feeding at the edges of the bogs, and slipping into the dense growth if too nearly approached. The birds showed variation in both color and size, but the spotting in perfect harmony with olive of the back. The calls and alarm notes resemble the other thrush notes, but are easily separable, the "when" being thinner than that of the Wilson. The "cluck" was a common note; also the notes resembling the Nighthawk, a call which is like no other Thrush unless it should be the Alice, with which I am not familiar. Mr. Howell gives the song "weé â weé â wee chi chi wee, whistled through closed teeth." I heard it mostly given weé â weé â we we, then the chi chi, the last thin and high, but with the vibrant quality of the Wilson without change of pitch, closing with wea wea. On these last two unaccented notes only an interlude between repetitions of the vibrant

*One of the Polytrichiums. Plants laid close together, as they grow, the root ends beautifully curved at the bottom and the capsules crowded together at the rim and overlapped by the blanched leaves of the beech.

notes. We sought diligently and perseveringly for the nest, but without success. The cover was so dense, the stiff, low-growing boughs so interlaced, that it was impossible to penetrate many feet from the road. We searched every available group, sometimes climbing over the tops of low-growing trees when no opening could be made. On June 22 the men were cutting trees to mend the road, and when they had penetrated a close growth, a pair of birds circled about them, showing great distress. Examination revealed a crushed nest and eggs in the felled tree. The season was not favorable for nest-hunting, almost every day in June being in whole or part rainy, and with high winds often making it impossible to keep one's footing in the open on the summit. We are trusting more favorable conditions and results another year.

71. **Hylocichla swainsonii.** Olive-backed Thrush.—Abundant on the North Branch and lower slopes, extending well up to the limits of timber, but decreasing then in numbers. One was located at point where the hotel is first sighted, the highest range found. This bird often sang within hearing of the house. Were found well up the mountain sides, both in Smuggles and Underhill Notches. Well-grown young, July 19, in both above-named places. It was impossible not to contrast the song of Bicknell and Olive-back, as both were heard together. The latter suggested the rich odor of the fragrant firs and the former their spiring tops. Found the Olive-backed more shy than Bicknell.

72. **Hylocichla guttata pallasii.** Hermit Thrush.—Well distributed along the road to the Notch proper, but only to left of this road. Also on the South Branch, but not common. Seemed to be confined to the woods south-east of the mountain base, through which flowed the South Branch. Mr. Lorrey says, "Singing freely about the summit in July." On July 23 I was on the ridge near the cavern when a Hermit broke into song just below me on the slope toward the Underhill, singing continuously for almost ten minutes, then again at short intervals. At no other time was this bird heard anywhere above the base, and had probably pushed up the sharp slope temporarily.

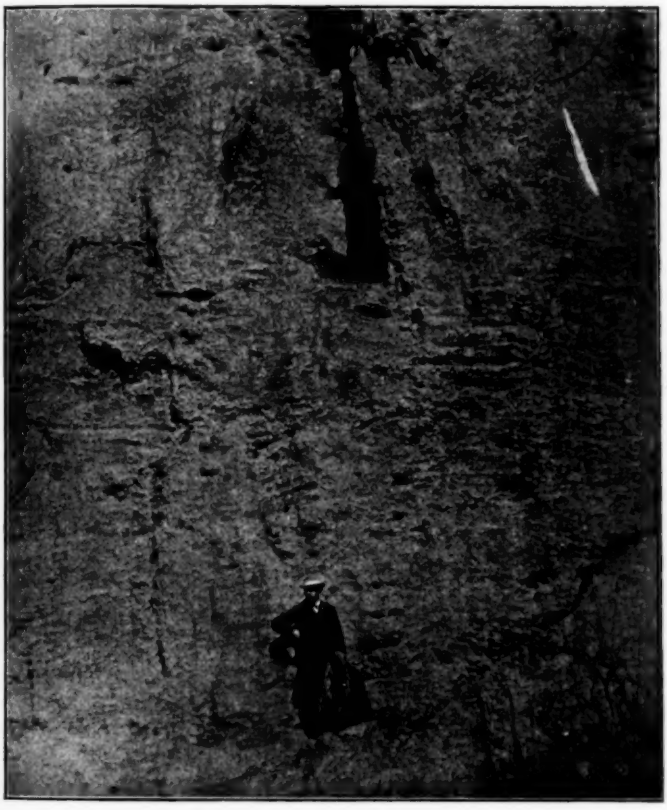
73. **Merula migratoria.** Robin.—Abundant at the mountain base. A pair located on the summit seemed much more shy than those commonly nesting about our houses.

74. **Sialia sialis.** Bluebird.—Several nesting about Mr. H.'s and to the base of mountain. Numbers came about the orchard, their soft notes and calls heard when the song season proper had passed.

A NEST OF THE WESTERN HORNED OWL (Bubo virginianus subarcticus.)

BY EDWARD R. WARREN.

In the early part of May, 1901, while in Paonia, Delta county, Colorado, I heard of a nest of the Western Horned Owl. On the 8th we drove out there to investigate, and found the nest site in a cliff or bluff of adobe clay facing the west. The nest was 18 or 20 feet above the base of the bluff and as far or farther below its top. As we approached the place the old bird flew away.



NESTING SITE OF WESTERN HORNED OWL—NEST IN THE CLEFT ABOVE THE MAN'S HEAD.

While there appeared no way to reach the nest from below, it was possible to scramble to the top of the bluff above the nest. Arrived at the top, a rope, a loose fence post and a conveniently placed prairie-dog hole furnished the desired combination. The first descent proved fruitless as far as the nest was concerned, but embarrassingly fruitful in the amount of "dobe" carried to the bottom of the cliff. The dry wall of dirt crumbled at the touch into dust as fine as flour, or rattled down in chunks at a vigorous blow.

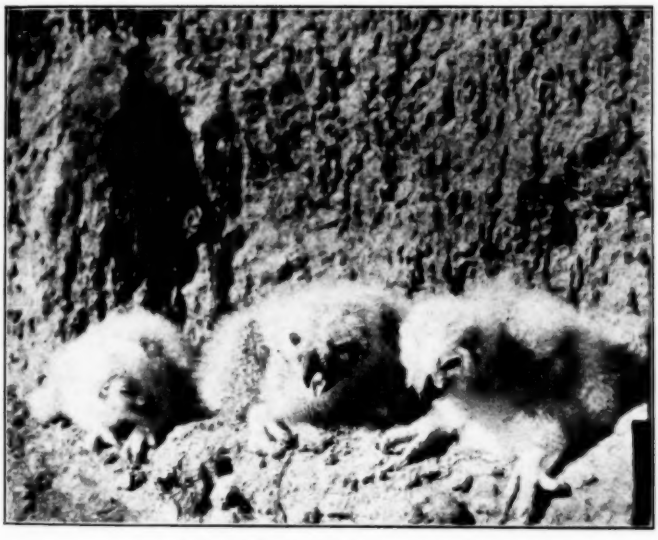
The second descent was successful in locating the nest on a shelf about six feet wide and four feet deep, sloping slightly down toward the edge—rather insecure footing on that crumbling soil, but making the use of the camera possible.

There were two young in the nest. After a snap at them in the defensive attitude which they immediately assumed, backing up against the adobe wall, I attempted to move them into a better light, but one of them chose to flutter down from the protecting ledge. I followed and had him at my mercy. His picture shows how he felt about it, and how his evident temper impressed the camera. We left the young bird at the foot of the bluff, feeling certain that the parents would find it.

The next day we returned and carried the other youngster home in a bag, and made a pet of him. He seemed to thrive on shreds of tough old rooster, which he refused to help himself to. At first I placed it in his mouth, but in the end found that the most expeditous way was to take hold of the bird's head, force open his bill, and poke the food down his throat. As he could swallow pieces of the roostes's neck an inch long, his digestion must have been good.

The bird stood about twelve inches high. The body plumage appeared to be mostly down—soft, fluffy and thick—but the wing and tail feathers were about half out of their sheaths. Ordinarily the ear tufts projected about half an inch, but sometimes fully three-quarters of an inch. The feet and legs were thickly covered with a yelowish or light buffy down.

The whole of the body down was barred, below as well as above, like the adult plumage. The body was light yellowish brown, gray tipped. The wing coverts were brownish yellow, with very dark bars fully a quarter of an inch wide. The primaries, secondaries and tail feathers were as dark as the bars



YOUNG WESTERN HORNED OWLS.

of the coverts, with still darker bars. The feathers of the face were just beginning to show.

During my absence the owl grew normally, and finally escaped, only to return for more chicken, and was killed while indulging a cultivated appetite for chicken.

I visited the nesting site in April of the following year. An empty egg shell proved that the nest was occupied again. Returning on the 13th we found the post ready set. The old bird was on the nest when I started down, but soon flew away. In the nest were three downy young, with pin feathers just beginning to show in the largest bird. There were also three young Pinon Jays, a Pocket Gopher (Thomomys), and the hind quarters of a cotton-tail rabbit, all food for the young.

YOUNG WESTERN HORNED OWL.

The few shredded cedar-bark fibers could hardly be called a nest.

The down of the young birds was white. The smallest one (at the left in the picture) I judged to be about ten days old, since it was ten days since I had found the shell at the base of the bluff. No opportunity offered for a further study of this interesting family.

WINTER BIRDS OF CENTRAL PARK, NEW YORK CITY.

BY CHARLES H. ROGERS.

My own notes, which cover the past three seasons, have been supplemented by those of Mr. George E. Hix and Mr. R. E. Stackpole, to whom I owe grateful acknowledgements.

All numbers of individuals, unless otherwise stated, refer to that part of the park north, to 86th street on the west and the Museum of Art on the east and south to about 73rd street.

I. WINTER VISITORS, 15.

1. **Larus argentatus.** Herring Gull. 51.—All through the winter flocks sometimes numbering fifteen hundred birds, though usually less, visit the large Croton Reservoir, a few only occasionally visiting the small one. In other parts of the park they may be seen flying overhead singly and in small parties. Arrival: earliest, October 9; latest, November 6; average, October 27. Last seen: earliest, April 18; latest, May 5; average, April 27.

2. **Aythya americana.** Redhead. 146.—On January 1, 1903, I saw a male (with two females of the same species?) feeding together on the big reservoir, apart from the gulls.

3. **Dryobates pubescens medianus.** Downy Woodpecker. 349c.—One male and one female in 1900-1; the same in 1901-2; and in 1902-3, two males and two females. Arrival: earliest, August 23; latest, October 20; average, September 19. Last seen: earliest, April 13; latest, May 2; average, April 22.

4. **Carpodacus purpureus.** Purple Finch. 517.—I saw one male, February 3, 1903.

5. **Zonotrichia albicollis.** White-throated Sparrow. 558.—This, one of our commonest winter birds, was strangely less common last winter. In 1900-1 about seventy were present, and the next

winter a hundred, but last season the largest number seen in one hunt was sixteen. Arrival: earliest, September 28; latest, October 5; average, October 2. Last seen: earliest, May 20; latest, May 24; average, May 22.

6. **Spizella monticola.** Tree Sparrow. 559.—This Sparrow has been recorded on the following dates only: February 24, 1902, 2; February 26, 1902, 8; February 27, 1902, 3; February 20, 1903, 1.

7. **Junco hyemalis.** Junco. 567.—Very common migrant, uncommon in winter. Arrival: earliest, September 28; latest, October 6; average, October 3. Last seen: earliest. April 30; average, April 22.

8. **Passerella iliaca.** Fox Sparraw. 585.—1900-1 only, Fox Sparrows (4) spent the winter in the park. Late autumn migrants are sometimes seen early in December. Eight seen February 12, 1901.

9. **Thryothorus lubovicianus.** Carolina Wren. 718.—One each of this and the following species seen December 2, 1902. They had both been seen occasionally that autumn.

10. **Olbiorchilus hiemalis.** Winter Wren. 722.—See next above; also one seen December 30, 1900.

11. **Certhia familiaris fusca.** Brown Creeper. 726.—Regular but not common. 1900-1, 1; 1901-2, 3; 1902-3, 3. Arrival: earliest, October 1; latest, October 5; average, October 3. Last seen: earliest, April 18; latest, May 7; average, April 27.

12. **Sitta carolinensis,** White-breasted Nuthatch. 727.—Regularly every other year. In 1900-1 there were three; last winter only one. Arrival: 1900, September 29; 1902, October 8. Last seen: 1901, April 11; 1903, March 20.

13. **Parus atricapillus.** Chickadee. 735.—One spent the winter of 1900-1, also one seen November 4, 1902. No others seen the last two winters. Arrival: 1900, October 20. Last seen: 1901, April 10.

14. **Regulus satrapa.** Golden-crowned Kinglet. 748.—Some belated autumn migrants seen December 2, 1900; also I saw several on Christmans Day, 1901, and two paid us a visit from December 24, 1902, to January 5, 1903, inclusive.

15. **Hylocichla guttata pallasii.** Hermit Thrush. 759.—One spent the winter of 1901-2.

II. PERMANENT RESIDENTS, 7.

16. **Colaptes auratus luteus.** Northern Flicker. 412.—In 1900-1, I saw only two individuals, one each on January 6 and 15. Next season a female remained through the winter, but in 1902-3 I saw only one, February 13.

17. **Sturnus vulgaris.** Starling. 493.—In 1900-1 the largest number seen in one hunt was 65, the next winter only 25, and in 1902-3, over a hundred.

18. **Carduelis carduelis.** European Goldfinch.—1900-1, 6; 1901-2, 15; 1902-3, 6.

19. **Fringilla cælebs.** Chaffinch.—One male was present in 1902-3, and in the spring several Chaffinches were liberated.

20. **Melospiza cinerea melodia.** Song Sparrow. 581.—In 1900-1, two individuals, next season, five, and last winter, four.

21. **Cardinalis cardinalis.** Cardinal. 593.—In 1900-1, one male; 1901-2, two males and a female; and in 1902-3, two males and two females. During the mild weather about Lincoln's Birthday, 1903, a pair of Cardinals built a nest and laid one egg; both nest and egg were, of course, destroyed by the next snow.

22. **Merula migratoria.** American Robin. 761.—Three were present during each of the last three winters.

III. OCCASIONAL STRAGGLERS FROM THE COUNTRY.

23. **Buteo lineatus.** Red-shouldered Hawk. 339.—One was present for a week or two late in December, 1901, and early in January, 1902, before he was shot. A large hawk, species unidentified, was seen on February 10 and 17, 1901, and December 14, 1902.

24. **Falco sparverius.** American Sparrow Hawk. 360—I saw one in January, 1902, and a small hawk, probably of this species, January 2, 1903.

25. **Asio wilsonianus.** American Long-eared Owl. 366.—I saw one December 6, 1901.

26. **Megascops asio.** Screech Owl. 373.—I saw one December 28, 1902.

27. **Corvus americanus.** American Crow. 488.—One spent the winter of 1899-1900 and I saw one flying overhead February 16, 1901.

28. **Agelaius phœniceus.** Red-winged Blackbird. 498.—I saw a male December 7 1901.

29. **Sialia sialis.** Bluebird. 766.—I saw three December 15, 1901.

IV.

The following three winter birds have been seen in Central Park, but not in winter:

30. **Loxia cuvirostra minor.** American Crossbill. 521.—I saw a flock of about half a dozen, of which only one was an adult male, April 6, 1899.

31. **Acanthis linaria.** Redpoll. 528.—One female was seen Noveber 10, 1901.

32. **Lanius borealis.** Northern Shrike. 621.—I saw one on November 5, 1901.

V.

33. **Quiscalus quiscula.** Purple Grackle. 511.—An early spring migrant, seen February 28, 1903.

I would be glad to hear from any readers who can add to this list.

THE TERNS OF THE WEEPECKET ISLANDS, MASSACHUSETTS.

LYNDS JONES.

The preservation and gradual increase of the various Tern colonies along the Massachusetts coast is largely due to the interest and attention of Mr. George H. Mackay, who has kept us informed of the progress of the colonies at Penekese and Muskeget. Attention was called to a small colony of terns at the Weepecket Islands, in 1896, by Mr. Reginald Heber Howe, Jr., who reports the results of two visits to these islands on June 27 and 30, 1896, in the Auk for April, 1897, page 203. The results of Mr. Howe's study may be briefly summarized.

On the outer island about fifty birds were flying about, but only three nests, each containing two eggs, were found. These nests were placed upon the edge of the plateau, well hidden in the grass and poison ivy. "The Roseate Terns *(Sterna dougalli)* were apparently the only inhabitants of this island."

About he same number of terns were counted above the Middle island, and two nests were found on the beach and two on the edge of the plateau concealed beneath the scrubby poison ivy. The most of the birds here were Roseates, but there were a few Common Terns *(Sterna hirundo)*.

The population of Great Weepecket was studied on June 30. On the upland 25 nests were found, two empty, three with one egg, seven with two, twelve with three, and one with four, and one with a chick. On the beach eight nests were found, three with one egg, two with two, and three with three. Total, 34 nests.

"The nests on the uplands were in almost every case placed near or at the base of the scattered boulders, and on the beach on the sea weed. The colony consisted of perhaps 200 terns, the majority Roseates; but as the terns on the three islands all gathered over one when walking about the island, and others are off fishing, a correct estimate is impossible."

During nearly the whole of July and the first half of August the writer enjoyed unusual opportunities for studying the terns of these islands, and a comparison of conditions now with those of 1896 may prove interesting. The boats of the U. S.

Fish Commission and of the Marine Biological Laboratory were placed at my disposal, and it was due to the courtesy of these organizations that I was able to visit these islands on several different occasions for more or less extended study.

July 10, Mr. Irving A. Field, of the Fish Commission, accompanied me, when we made a pretty careful count of the nests on the three islands. On the outer small island we found 53 nests, the most of them among the weeds on the higher parts of the beach, concealed more or less. The top of this island was so densely covered with grass that but half a dozen nests could be accommodated along its edge. The lower beach nests were wholly exposed, and seemed to belong to the Common Tern, while the protected nests of the higher places appeared to belong to the Roseate Terns. It was possible to be absolutely accurate in identification only when there was a chick in the nest. Most of the birds hovering above the island and making hostile demonstrations were Roseates.

Middle Weepecket contained but 19 nests, one of them containing five eggs. The position of the nests, as well as the actions of the birds flying about indicated that the Roseates were in the majority here, but not so much so as on the outer island. There were more nests on the top among the scrub poison ivy and grass, and fewer on the beach exposed.

Great Weepecket was the home of the Common Tern to the almost exclusion of the Roseate. Not more than three nests of the Roseate were positively identified here. The upper level is so much more extensive than the beach levels, and so well grown with poinson ivy and bay berry bushes, and so broken up with hollows and elevations, that it was next to impossible to make an accurate count of the nests, or rather, to find all of them. 337 nests were found on the beach levels and 189 on the upper levels. Few or none were concealed by bushes or grass. One was found in an old wrecked dory, and two were placed partly under large boulders, but their situation could hardly have been for concealment. Very few of the eggs lay upon the bare ground. The nests were made of dry grasses, or dry sea weed, some being even elaborately made—for a tern.

One nest containing six eggs pretty clearly belonged to two birds; 13 contained five eggs; 22 contained four eggs. The

variation of the eggs in the nests containing but two eggs was so great that it was rarely possible to tell whether the nests of five belonged to two or to but one bird. That point can be settled only after careful study with the birds under close scrutiny.

Over 20 young birds unable to fly were counted on the three islands, but they were not considered in making an estimate of the population of the islands. 618 nests were actually found, thus arguing a population of 1,236 old birds. It is almost certain that many nests were overlooked, and it is not likely that many nests were counted twice. Probably an estimate of 1,500 old birds would be far within the facts. Thus it would appear that the rate of increase since 1896 has been enormous. On the two smaller islands the Roseates have more than held their own, while on the large island the Common Terns have come in hordes to possess it.

While there were more eggs than young birds and empty nests on the beach levels of the large island, on the upper levels the empty nests and young predominated. Apparently the first comers built their nests on the uplands by preference, while the later comers were either forced to occupy the lower levels or chose to do so. A little more care was manifest in the selection of a nesting site and in the construction of the nests on the uplands than on the beach. One might argue from this that the upland breeding birds were the more experienced, and therefore probably the older birds, but systematic study will be needed to prove it. The number of eggs in a nest also appeared to average larger on the uplands than on the beach levels.

It is common knowledge that tern eggs are protectively colored to simulate pebbles on the beach. Nests made of sea weed scattered among the pebbles were hard to see, because the color of the sea weed resembled the stones and the eggs. On the upper levels, however, and on the light colored sands among the grass, and where the nests were made of light colored fine grass, the eggs were easily detected by their bold blotches. They would have been less conspicuous little end up, but tradition forbade such an arrangement. Why tradition should permit the use of nonprotective nest material and not also furnish a degree of protection in either color or position

of the eggs is not clear. Perhaps she has not had time to complete her line of research yet.

It is also common knowledge that the downy young are protectively colored while on the beach, the mottling of the downs with tawny and dusky producing the effect of pebbles and small stones, and sea weed. It is interesting to notice that while the downy young of the Common Tern are thus mottled, the downy young of the Roseate Tern are longitudinally streaked from head to tail, the whole effect being decidedly darker. Incidentally, the legs and feet of the Roseate are dark, but of the Common almost orange, in the downy young. In both species the throat is dusky black, but the rest of the underparts, including the under side of the wings, are pure white. An explanation of this difference in pattern of coloration in the downy young of the two species is found in their habits and surroundings. I found young of the Roseate only on the uplands or among the weeds and grass of the upper beach slopes, always more or less concealed by the grass or weeds. Here the colors blend well with the surroundings. Many of the young of the Common Tern were on the beach and could be seen there with difficulty; but those which occupied the upland nests, or crouched among the grass and bushes were usually readily seen, because the mottled downs rather contrasted than harmonized with the surroundings. One is almost forced to the conclusion that the traditional nesting place of the Roseate is among grasses, while that of the Common is on the beach among pebbles and sea weed.

My work was a minute study of the nestling and juvenile plumages, but the results of that work can better await a more careful treatment than the limits of this paper make possible. It is sufficient to say that the body and inner wing markings of the juvenile Common Tern, on the dorsal side, give the effect of dark bars on a tawny or buffy ground, while the markings in the same regions of the Roseate give the effect of mottling in tawny and dark gray. As the two species crouched in the grass often side by side, it was easy to compare the relative protective effect of the two plumages which are really so much different in general effect. On the whole, it was a little more difficult to detect the young Common Tern than the young Roseate in the grass and bushes, but the young Roseate

was better concealed among the weeds with large leaves. Among the pebbles and stones the Common was the more readily seen. The underparts of the young Common were entirely pure white, but of the Roseate with a faint tint of cream or even rosy.

The Weepecket terns seemed to feed almost wholly in the vicinity of Woods Holl. They ranged from Quisset to the bathing beach or even all along the west shore of Penzance, Great and Little Harbor, and the region of Vineyard Sound bordering the harbors, and in Hadley Harbor. Some range farther, of course, but the birds feeding young appeared to content themselves with the region named.

Unlike the gulls, the terns do not swallow the food and then regurgitate for the young, but carry the fish in the beak directly to the young. After studying the feeding process at close range for some time, I became convinced that the old birds do not stuff the fish down the throat of the young, but only thrust its head into the mouth far enough for the throat muscles to grip it, when the young bird swallows for himself. The Sand Lance *(Ammodytes americanus)* was the chief fish food, probably because it is so soft and easily digested. A four-inch fish could not manage to get wholly inside a four-inch bird, so the tail was left sticking out for future consumption! Even with the young able to fly the fish's head rested in the primitive gizzard while the tail was scarcely more than concealed in the throat. Mr. Field induced one Muskeget young Common Tern to part with his dinner of two young Herrings and one Sand Lance. Usually but a single fish was found in the digestive tract of the young.

The downy young merely raised their heads and opened their mouths for food, when very hungry uttering a faint peep, but the young ones able to fly were made to dance for their dinner. With widely gapping mouth and wings held akimbo, they executed a surprisingly fine clog to their own piercing music! In one case a young bird called for lunch just 20 minutes after receiving a good sized fish. He was not fed, however, until half an hour after his last lunch. I have repeatedly seen the old birds swallow three and four Sand Lances in rapid succession. This colony of 1500 old birds and their 1500

young must consume great quantities of the Sand Lance, yet the supply does not seem to diminish.

There is no uniformity in the development of the instinct to assume protective attitudes. With some young there is no evidence of such an instinct while they remain in the nest, while with others there seems to be almost as soon as the shell is cast. All of the young from the beginning of the pin feathers gave evidence of the instinct well developed. Some young left the nest two days after hatching, some remained for four days. When partly feathered birds on the uplands were taken from their hiding places in the grass or bushes their tendency was to try to run away instead of hiding again when replaced on the ground. Those on the beach treated the same way would invariably take to the water if not prevented. Even the young upon which the pin feahers were barely showing frequently took to the water and swam readily. In hiding, the birds were content to emulate the Ostrich, hiding only the head and often leaving the whole body exposed. They were always careful, however, to keep the white underparts well concealed.

In two cases that were under careful observation for some time both parents performed the office of incubation in regular turn. The one that I judged to be the female brooded the eggs, tucking them carefully under her feathers, but the male merely stood above them, apparently shielding them from the burning sun, while the female went for a lunch and bath. The incoming bird uttered a peculiar rattling sound just before alighting some 20 feet from the nest, when the brooding bird got up and immediately flew away. The relief carelessly sauntered toward the nest, made believe picking up food when it reached the nest, then stood over it a moment before settling down, if the female. Neither bird remained on the nest over an hour, the male usually less than forty minutes, not waiting for the female to appear every time before leaving.

It was interesting to watch the old birds come in with a fish dangling from the beak. As it passed close along the beach each young bird in turn clamored for the morsel. When the old bird approached the place where its young had been last seen it skimmed above the stones, halting now and then before a particularly vociferous youngster, then either passed on or circled

back to look farther, finally either finding its own young or going to another place where another young had been left. I was eager to know how the old birds could recognize their own offspring among the multitude which looked exactly alike to me. It seemed incredible that they depended upon sight, or why should they almost actually touch the young each time before deciding the matter? I was forced to the conclusion that the sense of smell must play an important part in the final determination.

Later in the season young birds were seen following the old birds to where they fished, all the while loudly calling for food. I was prepared to see the morsel delivered while the birds were still flying, after the manner of the swallows, but it was never so done. The young, at least, must first rest upon the water or land, then the old usually settled for the moment of the delivery, the young bird first shaking his feathers well before rising and following. During the second week in August young birds were to be seen and heard about Great Harbor and Penzance, but none appeared to be fishing for themselves. Up to this time there appeared no evidence that either the old or young had begun to molt.

The terns appear to fish in companies, following schools of fishes of any species which may be suitable for food, size of the individual fish appearing to be the prime requisite. The fishes actually found in the stomachs or protruding from the mouths of the young birds, and some found on the islands accidentally dropped by the birds, or dropped near the young, are as follows: Sand Lance *(Ammodytes americanus)*, Cunner *(Tautoglabrus adsperus)*, Mullett *(Mugil curema)*, Pollock *(Pollachis virens)*, Flounder *(Pseudopleuronectes americanus)*, and young Herring (species not determined). Of all the food the Sand Lance comprised not less than 80 per cent.

It has been said that a tern never misses the fish which he dives for. I have seen many birds dive repeatedly without success. Most of the fish appeared to be grasped just a little in front of the middle, and were never struck with the closed bill, but grasped between the mandibles in every instance noticed. The fish are swallowed head first.

Many things in the life history of the terns need to be studied carefully before we can explain their true relationships with satisfaction.

KIRTLAND WARBLER *(Dendroica kirtlandi)* FOUND BREEDING.

Ohio ornithologists congratulate Michigan ornithologists upon their great good fortune in finding the nest, eggs and young of Kirtland Warbler in their own state. We shall await with keen anticipations the appearnce of the next Bulletin of the Michigan Ornithological Club, with its promised contributions on the life history of this little known warbler.

INFORMATION WANTED.

We desire to call attention again to the two lines of investigation and the call for help in completing the work. Mr. Alex. W. Blain, Jr., 131 Elmwood avenue, Detroit, Mich., desires information of any sort concerning the Great Blue Heron *(Ardea herodias)*. Lynds Jones, Oberlin, Ohio, desires information concerning the Mourning Dove *(Zenaidura macroura)*, and the loan of series of skins from all parts of the country, but particularly from the northwestern states and Canada.

ELECTION OF OFFICERS FOR 1904.

The attention of all members is called to the provision in our Constitution which calls for the nomination of persons for the offices of President, Secretary, Treasurer, and three members of an Executive Council. These nominations are to be made during the month of September, and should be sent to the President, Lynds Jones, Oberlin, O.; they will be counted if mailed on the last day of September. It is important that each Active member should make nominations. This matter will not take care of itself, but requires study at Woods Holl.

A CORRECTION.

In Bulletin 42, page 27, line 13, "Downey Woodpecker, 10," should read, "Downy Woodpecker, 1 female."

THE WILSON BULLETIN.

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EDITORIAL.

The editor spent July and the first half of August at that incomparable Marine Biological Laboratory, Woods Holl, Mass. While the islands of the region furnish perfect conditions for studying the breeding habits of three species of terns and one species of gull, the whole region is an exceptionally good one for the study of the summer habits of at least a dozen species of warblers, the Veery, and many other interesting birds, while on Martha's Vineyard the last of the Heath Hens may still be found. As a place for varied bird life it has few if any equals in our country. July and August are especially favorable months for bird study Woods Holl.

The July Auk contains the Twelfth Supplement to the A. O. U. Check-List. Twenty-three new species and subspecies are added, of which three are Otocoris and four Melospiza. It would be entirely possible to dispense with any more forms in these two already over crowded genera. The most marked feature of this revision is the raising to generic rank of 23 subgenera, by which several of our best friends assume a wholly unfamiliar name. But mere temporary inconvenience furnishes no argument against such radical change. We must feel some misgivings, however, when we reflect that in other departments of Zoology, speaking generally, there are often far greater differences between species than there

are between genera in Ornithology. One can hardly avoid the suspicion that Trinomialism is working this discrepancy. But we must also remember that intensive study, such as our chosen science is receiving, tends to discover differences where none were known to exist before, while it is also likely to magnify really slight differences. It is hard to draw the line. Former experiences prepared us for the usual reprinting of practically the whole Melospiza group. It is certainly a flexible genus or the contortions it is periodically called upon to go through would have disrupted it long ago. Forty proposed changes and additions were acted upon favorably, and nearly a hundred cases are deferred. We see no signs of the coming of stability in nomenclature, except the report of progress which this supplement may be considered to be.

PUBLICATIONS RECEIVED.

Birds in their Relation to Man. By Clarence M. Weed and Ned Dearborn. A Manual of Economic Ornithology for the United States and Canada. J. B. Lippincott Company, Philadelphia and London..

The timliness of this new volume will ensure for it a welcome among bird students everywhere. It is well illustrated in halftones and cuts with many new pictures of birds and insects. It is printed on good heavy paper in twelve-point type, and the typography is unusually good.

The subject matter may be divided into four parts, the first seven chapters being devoted to a general discussion of "Methods of Studying the Food of Birds," "Development of Economic Ornithology," the food and amount consumed, "Birds as Regulators of Outbreaks of Injurious Animals," of the different groups, in the reverse order of the A. O. U. classification; the Conservation, Prevention of Depredations and Encouragement of the Presence of Birds; and finally an appendix giving the A. O. U. Model Bird Law, the Lacey Bird Law, "Some Fundamental Principles of Bird Laws," "A Partial Bibliography of the Economic Relations of North American Birds," and Index.

Into this volume have been gathered the many scattering accounts of the food of birds, and some new information is given about the food of several species. It is not assumed that everything has been learned about the food of our birds, but it is hoped that the book will prove of some value to those who wish to learn what the economic status of the different birds is. It is a welcome addition to bird literature, and we have reason to thank the authors for their timely presentation of the book. L. J.

Bulletins I and II of the Philippine Museum. Bulletin I, on Birds from Luzon, Mindoro, Masbate, Ticao, Cuyo, Culion, Cagayan, Sulu, and Palawan. By Richard C. McGregor.

"This paper is the first of a proposed series of reports on collections made for the Philippine Museum, an institution established by and act of the Philippine Commission. It summarizes the more important results of: (1) Five weeks' collecting at Mariveles, Bataan Province, Luzon; (2) various two-day trips about Manilla; (3) three months in Ticao and Masbate; (4) a hurried visit to the Islands of Mindoro, Cuyo, Culion, Cagayan Sulu, and Palawan.

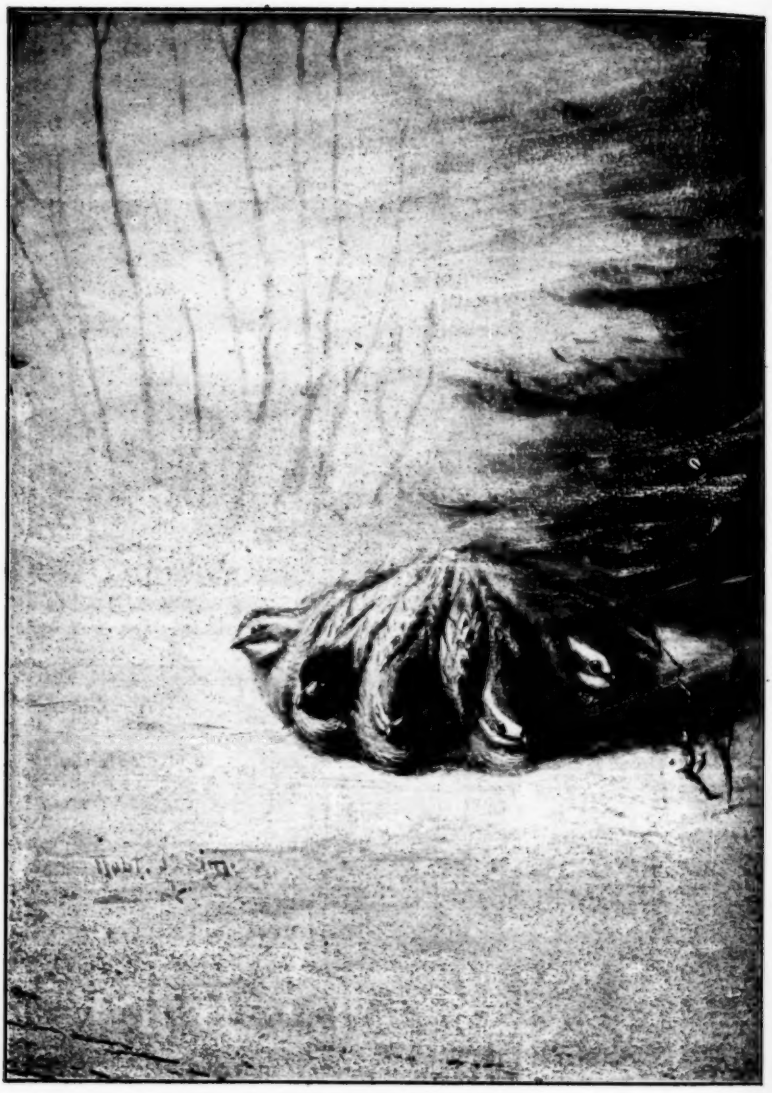
"But one of the species obtained appears to be new. The discovery, near Manila, of the males of Grant's two Luzon Orioles and the extension of the range of **Cinnyris whiteheadi** are most interesting."

"The work has been directed by Commissioner Dean C. Worcester, Secretary of the Interior, to whom the author is indebted for the use of books and assistance in many ways."

Six species new to the Philippines, one wholly new species, and the description of four hitherto unknown plumages, form the most interesting part of the paper to the general reader. New localities of upwards of 135 species are also given, indicating that a great amount of work is being done in that little known archipelago.

L. J.

Amateur Sportsman, Vol. XXIX, Nos. 2,3,4,5.
American Ornithology, Vol. III, Nos. 6, 7, 8, 9.
Atlantic Slope Naturalist, The, Vol. I, No. 3.
Bird-Lore, Vol. V, Nos. 3, 4.
Condor, The, Vol. V, No. 2, 3, 4.
Fern Bulletin, The, Vol. XI, No. 3.
Journal of Applied Microscopy, Vol. VI, Nos. 5, 6.
Maine Sportsman, The Vol. X, Nos. 118, 119, 120.
Naturaliste Canadien, Le, Vol. XXX, Nos. 7,8.
Plant World, The, Vol. VI, No. 6.



A BOB-WHITE COVEY.

From painting by Robert J. Sim.